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Eagle Point Solution to a Frequently Asked Question

How to Design a Vegetated Waterway Using RoadCalc – Survey Method – Total Station

Summary:
This document explains the process of designing a vegetated waterway in RoadCalc using a profile obtained from a total station or transit.

Product: Eagle Point Software™ 2004
Release: 2004 Q3 or 4.3.0 and greater
Platform: All
Related documents: *How to Design a Vegetated Waterway Using RoadCalc – Survey Method – Part II*

Survey Method

A total station or transit was used to obtain a profile of the proposed waterway centerline with cross-section taken about every 400' apart or closer as needed. The closer together that the cross-sections are, the better the ability of the designer to obtain good earthwork quantities and determine proper fit of the plan waterway into the existing landscape. Cross-sections should be taken at the farthest upstream and downstream extents of the waterway in order to obtain complete earthwork quantities.

Notation Method

Button to Press *Displayed Text* **Icon** Action {Text to Enter} *Menu Item…*

Things to Do First

1. Create an Eagle Point project and download or import the Total Station survey into the project and reduce the survey.
2. Open the Eagle Point project that has the original ground survey to use, and have only one dwg file open.
3. In AutoCAD, click on *Tools… Options…System….*
4. Checkmark *Single drawing compatibility mode*. Click OK.

Starting a RoadCalc Sub-Project Using an NRCS Prototype

1. At the EP Main Menu, click on *File… New….*
2. Highlight *RoadCalc Sub-Project* and click Next.
3. Make sure that the correct main project name is highlighted in the top box.
4. Input a project description. E.g. {Jensen WW 1}.
5. At the prototype setting pull down to select *NRCS 11x17 Waterway*.
6. Click Next.
7. Highlight the main project drawing and click Finish.
8. At the Open Project box highlight the RoadCalc project.

9. Click OK.
10. Click on EP Main Menu *Tools…Plot Scales…*.
11. Input the horizontal scale that you will use in a profile sheet. Example 1" = {100} feet. Press Tab.
12. Input the vertical scale that you will use in a profile sheet. Example 1" = {5} feet. Press Tab.
13. Click OK.

    Note: You can minimize the Eagle Point & Road Calc menu but you should NOT close out the EP main menu.

Place an Object for the Centerline and Convert it to the Alignment

1. From CAD, right click **Osnap**… *Settings*… and checkmark only *Nodes* and *Object Snap On*. Click **Polyline**.
2. Draw a line that represents the centerline of the proposed waterway, snapping to the proposed CL shots.
3. Place a radius at each vertex along the centerline to make sure that shots fall in the "outside triangle" don't get lost.
   A) Click **Fillet**. Input R. Press Enter. Input 1. Press Enter.
   B) Input P. Press Enter.
   C) Select the polyline.
4. Click *NRCS/EP… Waterway RoadCalc>> Alignment: Convert Object*….
5. Click on the line that represents the centerline. Press Enter.
6. Click a point close to the end of the waterway with the lower stationing.
7. Pull down Alignment as *Centerline*.
8. **If** the beginning stationing of the centerline is know:
   A) Input a Beginning stationing of the alignment. E.g. {0}.
   B) Click Apply.
9. Or, **If** a reference point or baseline exists along the centerline with a known stationing:
   A) Click Station Data….
   B) Click Reference Station….
   C) Click in Northing.
   D) Click the **Pick In CAD** button.
   E) Snap to the intersection of the centerline & the known baseline reference point.
   F) Input the Station value of the baseline E.g. {350}.
   G) Click OK.
   H) Note that the Beginning Station value appears in the box. If this looks realistic click OK.
   I) Click Apply.
10. Click *NRCS/EP… Waterway RoadCalc>> Alignment: Edit Data*….
11. Pull down Alignment as *Centerline*.
12. Review the alignment points & coordinates. Click Close.

Place Station Labels into Drawing

1. From AutoCAD, click *EP... Drafting*. (Drafting menu will appear within CAD menu).
2. Click *Annotate… Alignment Stationing…*.
3. Click Defined Alignments….
4. Select the Centerline and Click OK.
5. Click Apply. Click Close.
6. Click *EP… AutoCAD…* to switch out of the Drafting menu.

Place an Object for the Centerline Original Ground and Convert it to a Profile

1. Click **3D Polyline**.
2. Draw a 3D line that represents the centerline of the proposed waterway, snapping to the proposed CL shots.
3. Click *NRCS/EP… Profiles/Sections… Setup Profile Coordinate System…*.
4. Select the PCS for the current RoadCalc Project, E.g. {Road Calc PCS 01}.
5. Click Close.

6. Click *NRCS/EP… Profiles/Sections… Profile from Object…*.
7. Select the 3D polyline.
8. Click Yes.
9. Click *NRCS/EP… Waterway RoadCalc>>Profile: Convert Object…*.
10. Select the polyline. Press Enter.
11. Click Next.
12. Pull down Destination Profile name to *Ognd*.
13. Click Finish.

Converting Survey into Cross-Sections

1. Switch back to the plan view by clicking *NRCS/EP… Waterway RoadCalc>> Alignment: View Alignment…*.
2. Click Yes.
3. Click *NRCS/EP… Waterway RoadCalc>> Data Transfer-- Export…*.
4. Browse to the Project folder and input a File Name for a point export of the cross-sections, E.g. {Jensen XS.txt}.
5. Pull down format as *Station-Offset, Comma Delimited*.
6. Click *Alignment*….
7. Select your current RoadCalc Sub-Project Alignment.
8. Click *Settings*…
9. Checkmark Station Tolerance.
10. Set Tolerance to 5 & Interval to 5.
11. Set the Station Precision to 0 and Elevation & Offset to 2.
12. Click OK.
13. Click OK.
14. Pull down Selection Method to *AutoCAD*. Click Apply.
15. Within AutoCAD, select only the shots needed for the complete cross-sections.
16. When done, press Enter.
17. Number of nodes selected will show up. Click OK.
18. Click on *NRCS/EP… Waterway RoadCalc>> Cross Section: Import…*.
19. Browse to the Project folder and Highlight the File Name to bring into the cross-sections, E.g. {Jensen XS.txt}.
20. Pull down format as *Station-Offset, Comma Delimited*.
21. Pull down Import to Surface as *Ognd*.
22. Click Edit File.
23. The first column of this file is the *station*. Some lines have more than one offset/elevation listed with it. Edit this file so that all shots that are supposed to be in same cross-section have the same *station* number.
24. Click *File… Save…*.
25. Click *File… Exit…*.
26. Click OK.

View the Cross-Section Data

1. Click *NRCS/EP… Waterway RoadCalc>> Cross Section: Edit Data*….
2. Highlight the desired station in the top half of the screen and the data points for that station will appear in the bottom portion of the screen.
3. Click on the **Query Cross-Section** icon to preview of any cross-section. Use the + or – buttons to scroll through each of the cross-sections. Click Close when done.
4. Click Close.

View the Existing Ground Profile

1. Click *NRCS/EP… Waterway RoadCalc>> Profile*: *View Profile*….
2. Click Yes when asked to save the drawing. The Existing Ground Profile will appear.

An extra line will be added that connects the centerline at each cross-section. Turn off layer C.Prof.Ongd.Og_0 to make that line disappear.

Submitted by Norman Friedrich.